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THE NEW ENGLAND BOTANICAL CLUB

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THE NORTH AMERICAN SPECIES OF ERIOPHORUM.

M. L. FERNALD.

*PART I. SYNOPSIS OF AMERICAN SPECIES.*

THE genus *Eriophorum*, familiarly known as Cotton Grass, is generally distributed in the boreal regions of the northern hemisphere; and on account of its conspicuous perianth the genus is perhaps more quickly recognized by the general student than other members of the *Cyperaceae*. In spite of this comparative ease of recognition, or perhaps because of it, the genus, as understood in America, has come to be one with ill-defined botanical limits, and not sharply separated from some sections of the genus *Scirpus*; while its species as ordinarily interpreted in American floras are in an unfortunate state of confusion. A prolonged study of the material in the Gray Herbarium and the herbarium of the New England Botanical Club, supplemented by the very extensive collections of the Geological Survey of Canada, generously loaned by Mr. J. M. Macoun, and the material in several private herbaria, has led the writer to prepare the following synopsis of the American species. This synoptic treatment will be followed by a detailed discussion of the history and some of the affinities of the genus *Eriophorum*, with notes on certain species which have been misinterpreted in past treatments of the group. In the bibliography of this work the writer has been greatly assisted by Miss Mary A. Day.

SYNOPSIS OF SPECIES.

§ **VAGINATA**, Andersson, Cyp. Scand. 13 (1849). Spikelet solitary, without involucreal leaves; the lowermost scale usually en-



larged and more veiny than the others: culms usually bearing loose bladeless sheaths, or with only reduced blades.

\* Stoloniferous: culms mostly solitary: empty scales at the base of the spikelet few (usually 7 or less).

+ Anthers 1 mm. long: flowering spikelet obovoid; in fruit becoming globose, as broad as high: scales with very narrow pale margin.

E. SCHEUCHZERI, Hoppe. Culms soft, 0.5–3.5 dm. high: caudex loosely stoloniferous: leaves channeled or strongly involute, much shorter than the culms; those of the sterile shoots soft, 3–12 cm. long: culms at base slightly leafy, above usually bearing a bladeless loose membranous-edged black-tipped sheath (2–7 cm. long): flowering spikelet broadly obovoid or subglobose, 8–12 mm. long: scales lead-color or blackish, with slightly paler margins; the 1 to 3 outer ones ovate; the others ovate-lanceolate to lance-attenuate: fruiting spikelet depressed-globose, 2–2.5 cm. high: the bristles bright white: achenes narrowly obovoid, plano-convex or slightly 4-angled, 1.7–2.5 mm. long, 0.7–1 mm. broad, with a short slender beak. — Bot. Taschenb. (1800) 104, App. t. 7; Reichenb., Ic. Fl. Germ. viii. 35, t. 289, fig. 685 (1846); Ledeb., Fl. Ross. iv. 253 (1853); Bcklr., Linnaea, xxxvii. 92 (1871) & Cyp. Königl. Herb. Berlin, 628; Lange, Consp. Fl. Groenl. 129 (1880); Nyman, Consp. 762 (1882); Richter, Pl. Eur. i. 136 (1890); Norman, Christiania Vidensk.-Selsk. Forhandl. (1893) no. 16, 45; Clarke in Hook., Fl. Brit. Ind. vi. 664 (1893); Palla, Bot. Zeit. liv. ab. 1, 151 (1896); Britton & Brown, Ill. Fl. i. 272 (1896), in part; Ostenfeld, Fl. Arct. 41 (1902). *E. capitatum*, Host, Gram. i. 30, t. 38 (1801); Engl. Bot. xxxiv. t. 2387 (1812); Hornem., Fl. Dan. ix. t. 1502 (1818); Torr., Ann. Lyc. Nat. Hist. N. Y. iii. 336 (1836), except as to syn. *E. callithrix*; Hook., Fl. Bor.-Am. ii. 231 (1839), as to Labrador and Arctic plant; Anders., Cyp. Scand. 13, t. 2, fig. 31 (1849) and Bot. Not. (1857) 78; Macoun, Cat. Can. Pl. ii. 104 (1888) as to Labrador and Arctic plant at least. *E. leucocephalum*, Bcklr., Flora, xli. 419 (1858). Arctic America, extending south on the Labrador coast to Square Island (latitude 52° 44'), in the Rocky Mts. to the head of Lake Louise, Alberta (lat. 51°) and Revelstoke, British Columbia, and on the Alaska coast to Sitka (latitude 57°). Arctic Europe and Asia.

+ + Anthers 1.5–3 mm. long, slightly shorter than the filaments: flowering spikelet cylindric; in fruit becoming obovoid, distinctly longer than broad: scales with broad, pale margin.

*E. CHAMISSONIS*, C. A. Meyer. Loosely stoloniferous: sterile shoots bearing slender channeled leaves 1–6.5 dm. long: culms slender, terete, 1–8 dm. high: the lowest reddish brown sheaths blade-bearing; the uppermost scarcely inflated and mostly bladeless (3.5–10 cm. long): flowering spikelet oblong-cylindric, 1.5–2 cm. long: scales brownish-lead-color to blackish, with distinct whitish margin, ovate to ovate-lanceolate, bluntish: fruiting spikelet 2.5–4 cm. long: bristles reddish or cinnamon color: achenes trigonous.—C. A. Meyer in Ledebour, Fl. Alt. i. 70 (1829), as to description for the most part, synonymy, and citation of the Unalaskan specimen but not the Altai plant, and Mém. Sav. Étrang. Acad. St. Pétersb. i. 204, t. 3 (1831), except the Altai plant; Torr., Ann. Lyc. Nat. Hist. N. Y. iii. 337 (1836), mostly; Fries, Novit. Mant. ii. 1 (1839); Ledeb., Fl. Ross. iv. 253 (1853), mostly; Bcklr., Linnaea, xxxvii. 93 (1871), and Cyp. Königl. Herb. Berlin, 629; Richter, Pl. Eur. i. 136 (1890). *E. intermedium*, Chamisso, ex C. A. Meyer, ll. cc., (1829, 1831), as synonym, not Bast. *E. vaginatum*,  $\beta$ . *medium*, Laestad., ex Fries, l. c. (1839), as synonym. *E. fulvellum*, LaPylaie, ex Fries, l. c., 2 (1839), as synonym. *E. russeolum*, Fries, l. c., 2 (1839), as synonym, and l. c. iii. 170 (1842); Anders., Cyp. Scand 13, t. 2, fig. 32 (1849), and Bot. Not. (1857) 80; Blytt, Norges Fl. 271 (1861); Liebm. & Lange, Fl. Dan. Suppl. t. 8 (1874); Nyman, Consp. 762 (1882); Macoun, Cat. Can. Pl. ii. 104 (1888); Norman, Christiania Vidensk.-Selsk. Forhandl. (1893) no. 16, 45; Palla, Bot. Zeit. liv. ab. 1, 151 (1896); Britton & Brown, Ill. Fl. i. 272 (1896); Ostenfeld, Fl. Arct. 42 (1902). *E. vaginatum*  $\gamma$ , Hook., Fl. Bor.-Am. ii. 231 (1839), fide Fries, Novit. Mant. iii. 170. *E. capitatum*, Hook., Fl. Bor.-Am. ii. 231 (1839), as to synonym *E. Chamissoi*, not Host; Macoun, Cat. Can. Pl. ii. 104 (1888) as to Moose Factory plant. *E. Chamissoi*, Hook., Fl. Bor.-Am. ii. 231 (1839), in synonymy. *E. Scheuchzeri*, var. *Chamissonis*, F. Nylander, Acta Soc. Sc. Fenn. iii. (1852), and in Anders., Bot. Not. (1857) 58. *E. medium*, Anders. Bot. Not. (1857) 62. *E. rufescens*, Anders., Bot. Not. (1857) 79. *E. vaginatum*, b., Bcklr., Linnaea, xxxvii. 94 (1871), and Cyp. Königl. Herb. Berlin, 630. *E. russeolum*, var. *rufescens*, Hartm., Handb. ed. 11, 450 (1879).—Labrador and Alaska, locally south to Newfoundland, Saint Pierre, Miquelon, Quebec (ascending to the summit of Mt. Albert), Prince Edward Island, New Brunswick and Northern Nova Scotia; James Bay, and Mer Bleue,



Ontario; Lake Huron (fide Hook., Fl. Bor. Am.); Yellowstone National Park, Montana, Idaho, Washington and Vancouver. Arctic and subarctic Europe and Asia. Flowering June and July; fruiting July and August (mature in eastern New Brunswick, July 16, on Mt. Albert, Quebec, August 27).

Var. *albidum*, n. comb. Bristles white.—*E. russeolum*, var. *albidum*, F. Nylander, Acta Soc. Sc. Fenn. iii. (1852), & in Anders., Bot. Not. (1857) 58. *E. russeolum*, var. *candidum*, Norman, Ind. Supp. 46 (1864); Hartm., Handb. ed. 11, 450 (1879).—Same range as the species but less common, except perhaps about Behring Sea.

\* \* Caespitose, not stoloniferous: empty scales at the base of the spikelet numerous (usually 10–15).

+ Flowering spikelet oblong, 1–3 cm. long: anthers 2–3 mm. long: fruiting spikelet subglobose or broadly obovoid, as high as broad.

*E. VAGINATUM*, L. Densely caespitose, forming broad tussocks with very numerous stiff obtusely trigonous culms (1.5–7 dm. high): basal sheaths brown, long-persistent, fibrillose; basal leaves slender, trigonous, smooth or scabrous; cauline sheaths 2, conspicuously inflated above, veiny-reticulate, with dark (usually black) membranous tip: scales obovate to ovate-lanceolate, long-acuminate, lead-color or blackish, with whitish or pale margins: bristles glossy white.—Sp. 52 (1753); Engl. Bot. xiii. t. 873 (1801), ed Syme, x. 71, t. 1604 (1873); Baxter, Brit. Bot. vi. t. 427 (1843); Reich., Ic. Fl. Germ. viii. t. 289, fig. 686 (1846); Palla, Bot. Zeit. liv. ab. 1, 148, 151 (1896); Ostenfeld, Fl. Arct. 40 (1902); &c. *E. caespitosum*, Host, Gram. i. 30, t. 39 (1801).—YUKON DISTRICT, White Horse Rapids, Yukon River, Sept. 1, 1902 (*J. Macoun*, Herb. Geol. Surv. Can. no. 53,839): MACKENZIE DISTRICT, Artillery Lake, May 29, 1900 (*J. W. Tyrrell*, Herb. Geol. Surv. Can., no. 23,138). Northern Europe and Asia, and western Greenland.

The Tyrrell material from Artillery Lake is very fragmentary; but the oblong flowering spikelets, long anthers and very inflated sheaths are quite like those of the Old World *E. vaginatum*. The Macoun plant from the Yukon has the leaves harshly scabrous, a character unusual in the European plant, but noticeable in some Scandinavian specimens. Most other American material which has passed as *E. vaginatum* belongs to the two following species.

+ + Flowering spikelet obovoid or subglobose, 0.8–1.5 cm. long: anthers 1–2 mm. long: fruiting spikelet depressed-globose, broader than high.

++ Upper sheaths distinctly inflated: culm trigonous and (under the lens) scabrous at tip: pits of the receptacle with obtusely angled lower walls.

*E. CALLITRIX*, Chamisso. Similar to *E. vaginatum*: but with leaves generally scabrous in lines; the 1 or 2 upper sheaths less inflated: the flowering spikelet shorter and broader: the anthers shorter: the fruiting spikelet depressed-globose, 2.5–5 cm. broad.—Chamisso in C. A. Meyer, Mém. Sav. Étrang. Acad. St. Pétersb. i. 203, t. 2 (1831); Torr., Ann. Lyc. Nat. Hist. N. Y. iii. 337, (1836), in note; Ledeb., Fl. Ross. iv. 254 (1853), not Andersson and other European Authors. *E. caespitosum*, Pursh, Fl. i. 57 (1814); Eaton, Man. ed. 4, 294 (1824); not Host. *E. vaginatum*, Torr., Fl. 65 (1824), Ann. Lyc. Nat. Hist. N. Y. iii. 335 (1836), and Fl. N. Y. ii. 358, t. 141 (1843); Beck, Bot. 427 (1833); Hook., Fl. Bor.-Am. ii. 231 (1839), in part; Gray, Man. 529 (1848); Macoun, Cat. Can. Pl. ii. 103 (1888), in part; Britton & Brown, Ill. Fl. i. 272 (1896); not L. *E. Chamissonis*, C. A. Meyer in Ledeb., Fl. Alt. i. 70 (1829) and Mém. Sav. Étrang. Acad. St. Pétersb. i. 204 (1831), as to Altai plant, but not description and plate, &c. *E. capitatum*,  $\beta$ , Hook., Fl. Bor. Am. ii. 231 (1839). *E. virginatum*, Eaton & Wright, N. A. Bot. 237 (1840). *E. vaginatum*, var. *humile*, F. Nylander, Acta Soc. Sc. Fenn. iii (1852), and in Andersson, Bot. Not. (1857) 58. *E. brachyantherum*, Trautv. & Meyer in Middend., Reise,—Fl. Ochot. 98 (1856); Palla, Bot. Zeit. liv. ab 1, 148, 151 (1896).—Baffin Land and Ungava across North America to Behring Sea, and in northeastern Asia to the Altai; south in America to Pennsylvania, Michigan, Wisconsin, and Manitoba. Flowering, arctic and alpine regions, June, July; southern New England and Pennsylvania, early May: fruiting, arctic regions, July, August; southern New England, &c., late May and early June.

Var. *erubescens*. Bristles reddish brown.—NEWFOUNDLAND, sphagnous soil on rocky hill, Channel, July 27–August 1, 1901 (*Howe & Lang*, no. 899).

++ ++ Upper sheaths close or scarcely inflated: culm terete, glabrous at tip: pits of the receptacle with rounded lower walls.

*E. opacum*, n. comb. Loosely caespitose, forming small tufts with few very slender terete glabrous culms (3–6 dm. high): basal leaves nearly filiform, glabrous; cauline sheaths often with short



blades, the remote uppermost barely inflated toward the dark-edged tip: flowering spikelet globose-obovoid, barely 1 cm. long; fruiting spikelet globose, 2–3.5 cm. broad: scales lead-color, the outer ovate-lanceolate, the inner lance-attenuate: bristles sordid-white.—*E. vaginatum*, var. *opacum*, Björnstr., Grunddr. af Piteå Lappm. Växtfys. 35 (1856); Fries, Bot. Not. (1857) 11. *E. callitrix*, Anders. Bot. Not. (1857) 60; Fries, Bot. Not. (1858) 63; Blytt, Norges Fl. 270 (1861); Liebm. & Lange [*callitrix*], Fl. Dan. Suppl. t. 122 (1874); Hartm., Skand. Fl. ed. 11, 450 (1879); Palla, Bot. Zeit. liv, ab. 1, 148, 151 (1896); Ostenfeld, Fl. Arct. 41 (1902); not Chamisso. *E. vaginatum*, Macoun, Cat. Can. Pl. ii. 103 (1888), in part. Examined from the following American stations. ONTARIO, peat bogs, Hastings County, July 21, 1873 (*J. Macoun*): SASKATCHEWAN, muskeag north of Prince Albert, July 3, 1896 (*J. Macoun*, Herb. Geol. Surv. Can., no. 16,384): ATHABASCA, bogs, Clearwater River, July 11, 1888 (*J. M. Macoun*, Herb. Geol. Surv. Can., no. 32,297): ALBERTA, boggy places, Canmore, June 30, 1885 (*J. Macoun*, Herb. Geol. Surv. Can., no. 32,293); Banff, July 4, 1891 (*J. Macoun*, Herb. Geol. Surv. Can., no. 7,574); outlet of Lake Louise, August 14, 1897 (*E. Brainerd*): YUKON, marsh, 1500 feet above Hunker Creek, July 27, and Independence Creek, Aug. 1, 1902 (*J. Macoun*, Herb. Geol. Surv. Can., nos. 53,840 and 53,943): BRITISH COLUMBIA, east of Stewart's Lake, June 19, 1875 (*J. Macoun*, Herb. Geol. Surv. Can., no. 32,292); headwaters of Fraser River, July 21, 1898 (*W. Spreadborough*, Herb. Geol. Surv. Can., no. 20,779). Very local in Arctic Europe and Asia.

§ § **PHYLLANTHELA**, Andersson, Cyp. Scand. 12 (1849). Spikelets several (rarely 1), subtended by 1 or more foliaceous bracts.

\* Leaves slender, triangular-channeled throughout: involucre a single upright slender colored bract much shorter than the inflorescence.

← Upper cauline leaf with the sheath longer than the blade.

*E. GRACILE*, Koch. Weak and very slender, the subterete glabrous culms 2–6 dm. high, with no young basal leaves developed at flowering season: sheath of the upper cauline leaf 3.5–5.5 cm. long, the round-tipped smooth blade 1–4 cm. long, 1–1.5 mm. broad: involucral bract similar, usually dark at base, 1–2 cm. long: spikelets 2 to 5, the central one subsessile, the others on slender unequal minutely hairy spreading-ascending or finally nodding peduncles (0.5–3 cm.



long), in anthesis narrow-ovoid, 7–10 mm. long, in fruit 1.5–2 cm. long: scales lead-color or blackish, ovate to short-oblong, 2.5–4 mm. long, all but the outermost blunt or rounded-tipped: anthers linear, 1–2 mm. long: achenes linear-oblong, blunt, compressed, trigonous, 1.5–2 mm. long: bristles white.—Koch in Roth., Cat. ii. 259 (1800); Torr., Ann. Lyc. Nat. Hist. N. Y. iii. 341 (1836); Reich., Ic. Fl. Germ. viii. t. 290 (1846); Gray, Man. 529 (1848), in part; Engl. Bot. Suppl. iv. t. 2886 (1849) and ed. Syme, x. 74, t. 1607 (1873); Ett. & Pok., Phys. Pl. Austr. vi. t. 533 (1873); Watson, Bot. Cal. ii. 220 (1880), in part; Palla, Bot. Zeit. liv. ab. 1, 148, 151 (1896); Britton & Brown, Ill. Fl. i. 273 (1896), in part; A. A. Eaton, Bull. Torr. Club, xxv. 340 (1898); Britton, Man. 182 (1901). *Linagrostis paniculata*,  $\beta$ , Lam., Fl. Fr. iii. 555 (1778). *Eriophorum triquetrum*, Hoppe, Taschenb. (1800) 106. *E. polystachyon*, var. *tenellum*, Gray, Gram. & Cyp. pt. 1, no. 91 (1834), in part. *E. angustifolium*, Torr., Ann. Lyc. Nat. Hist. N. Y. iii. 339 (1836), in part, not Roth. *E. angustifolium*,  $\beta$ ? *brevifolium*, Torr., l. c. 340 (1836), in part.—Cold swamps and bogs, Gulf of St. Lawrence to Hudson Bay and British Columbia, south to Connecticut, Pennsylvania, Michigan, Nebraska, and California. Northern Europe and Asia. Flowering, April, May; fruiting May–July.

Var. *caurianum*. Involucre and scales straw-color or brownish: achenes 2.5–3 mm. long. — OREGON, subalpine regions, 1886 (*W. C. Cusick*, no. 1450): CALIFORNIA, Sierra County, 1874 (*J. G. Lemon*); south side of Mt. Shasta, alt. 5000–10,000 feet, July, 1897 (*H. E. Brown*, no. 628). A somewhat coarser plant than true *E. gracile*, but with the characteristic short blunt upper leaf.

+ + Upper cauline leaf with the sheath shorter than the blade.

*E. TENELLUM*, Nutt. Culms stiff, obtusely trigonous, scabrous above, 3–9 dm. high, with long slender green sharp-pointed often scabrous basal leaves: sheath of the upper cauline leaf 2.5–8 cm. long; the scabrous sharp-pointed blade 3–18 cm. long: involucre bract straw-color to reddish-brown at base, 1.5–6 cm. long: spikelets 3 to 6, mostly on unequal scabrous peduncles (0.5–3.5 cm. long), in fruit 2–2.8 cm. long: scales greenish straw-color to reddish brown, 2.5–5 mm. long: achenes linear-oblong, 2.5–3 mm. long, short-beaked: bristles whitish. — Gen., Additions (1818); Palla, Bot. Zeit. liv. ab. 1, 148, 151 (1896). *E. polystachyon*, var. *tenellum*, Gray, Gram. &

Cyp. pt. 1, no. 91 (1834), in part. *E. angustifolium*, Torr., Ann. Lyc. Nat. Hist. N. Y. iii. 339 (1836), in part, not Roth. *E. angustifolium*,  $\beta$  ?*brevifolium*, Torr. l. c. 340 (1836), in part. *E. gracile*,  $\beta$ . *pauciner- vium*, Engelm., Am. Jour. Sci. xvi. 103 (1844); Gray, Man. ed. 2, 502 (1856). *E. gracile*, Gray, Man. 529 (1848); Britton & Brown, Ill. Fl. i. 273 (1896), in part, including fig. 642. *E. pauciner- vium*, A. Eaton, Bull. Torr. Cl. xxv. 341 (1898); Britton, Man. 182 (1901). — Swamps and bogs, Newfoundland to Ontario, south to New Jer- sey and Illinois. Fruiting July and August.

\* \* Leaves flat, at least below the middle: involucre (except in dwarf vari- ety of *E. polystachion*) of 2 or more bracts.

+ Scales of the spikelet with only 1 prominent rib: stamens 3.

++ Midrib of the scale prominent only below the membranous tip: leaves triangular-channeled above the middle; the upper sheaths dark-girdled at summit.

*E. POLYSTACHION*, L. Culms 2–6 dm. high, slender, obtusely an- gled: basal leaves several, elongate, usually conduplicate, especially above the middle; cauline leaves few, remote, stiff, flat only toward the base, 1.5–15 cm. long, 1.5–4 mm. broad, the margins scabrous: involucre bracts 2 or 3, dark-colored at least at base, the longest 2–9 cm. long: spikelets 2 to 10, the central sessile, the others on divergent or drooping stout mostly glabrous peduncles (0.5–7 cm. long), in anthesis ovoid, 1–2 cm. long, in fruit 2.5–4.5 cm. long: scales lead-color to castaneous, ovate to lanceolate, acutish, 4–10 mm. long, the slender midrib disappearing below the pale membran- ous tip: anthers linear, 2.5–5 mm. long: achenes oblong-obovoid, compressed-trigonal, 2.7–3.5 mm. long: bristles bright white. — Sp. 52 (1753); Schk., Handb. i. 28, t. 8 (1791); Curt., Fl. Lond. iv. t. 9 (1821); Hook. [*polystachyon*], Fl. Bor.-Am. ii. 231 (1839); Reich. [*polystachyum*], Ic. Fl. Germ. viii. 35, t. 291 (1846); Britton & Brown [*polystachyon*], Ill. Fl. i. 273 (1896), in part; Britton, Man. 182 (1901), in part. *Linagrostis polystachia*, Scop., Fl. Carn. ed. 2, i. 48 (1772). *Eriophorum angustifolium*, Roth., Tent. i. 24 (1788), ii. 63 (1789), and Neue Beitr. 94 (1802); Engl. Bot. viii. t. 564 (1799); Hornem., Fl. Dan. ix. t. 1442 (1818); Beck, Bot. 427 (1833); Koch, Syn. 745 (1837); Hook., Fl. Bor.-Am. ii. 231 (1839), in part; Thomé, Fl. Deutschl. i. t. 102 B, C. (1886); Palla, Bot. Zeit. liv. ab. 1, 148, 151 (1896). *E. angustifolium*,  $\beta$ . *laxum*, Mert. & Koch, Deutschl. Fl. i. 456 (1823). ? *E. strictum*, R. Br. in Richards., App. Franklin Jour.

*Linagrostis angustifolia* and *Linagrostis angustifolia* = *E. angustifolium* Roth.

731—reprint 3 (1823); Torr., Ann. Lyc. Nat. Hist. N. Y. iii. 341 (1836); Hook., l. c. 232. *E. angustifolium*, var. *vulgare*, Koch, Syn. ed. 2, 860 (1844). *E. polystachyon*, var. *angustifolium*, Gray, Man. 529 (1848). *E. angustifolium*, var. *genuinum*, Engl. Bot. ed. Syme, x. 73, t. 1605 (1873). — Arctic America, south to Newfoundland, Nova Scotia, New Brunswick, Quebec, Lake Superior, and British Columbia. Europe and Asia. Fruiting, southern Canada, June, July; arctic regions, July and August.

Var. *ELATIUS*, Bab. Stout and tall (3–9 dm.): cauline leaves 4–8 mm. broad. — Man. 333 (1843). *E. polystachyon*, Engl. Bot. viii. t. 563 (1799); Host, Gram. i. 29, t. 37 (1801); Coult., Man. 368 (1885). *E. angustifolium*,  $\beta$ . *majus*, Schultz, Fl. Starg. Suppl. 5 (1819). *E. angustifolium*, var. *elatus*, Mert. & Koch, Deutschl. Fl. i. 456 (1823); Koch, Syn. ed. 2, 860 (1844). Engl. Bot. ed. Syme, x. 73 (1873). *E. ocreatum*, A. Nelson. Bull. Torr. Cl. xxix. 400 (1902). *E. polystachyon*, var. *majus*, Aschers. & Graebn., Syn. ii. ab. 2, 334 (1903). — Subarctic America, south to central Maine, Ontario, Illinois, Wisconsin, Iowa, and the mountains of Colorado and Oregon. Europe and Asia.

Var. *ELEGANS*, Bab. Slender, 0.5–2.5 dm. high: spikelets 1 to 3, sessile or subsessile: longest bract of the dark involucre 0.5–1.5 cm. long. — Man. 333 (1843). *E. gracile*, Sm., Engl. Bot. xxxiv. t. 2402 (1812) and Engl. Fl. i. 69 (1824), not Koch. *E. angustifolium*, var. *alpinum*, Gaud., Fl. Helvet. i. 131 (1828). *E. angustifolium*, var. *minus*, Koch, Syn. 746 (1837); Engl. Bot. ed. Syme, x. 73, t. 1606 (1873). *E. pseudo-triquetrum*, Schur, Eu. 695 (1866). *E. minus*, Dalla-Torre, Atl. Alpenfl. 216 (1882). *E. polystachyon*, var. *minus*, Richter, Pl. Eu. i. 136 (1890). *E. polystachyon*, var. *alpinum*, Aschers. & Graebn., Syn. ii. ab. 2, 334 (1903). — An extreme dwarf form of arctic and high-alpine regions. GRINNELL LAND (*A. W. Greely*): LABRADOR, Cape Chudleigh (*R. Bell*): ALASKA, St. Michaels (*L. M. Turner*). Arctic and alpine Europe.

++ ++ Midrib of the scale prominent, extending to the tip: leaves flat, except at the very tip; the sheaths and bracts not dark-girdled.

*E. viridi-carinatum*, n. comb. Culms slender, trigonous, smooth, 2–9 dm. high: basal leaves numerous, elongate; cauline few, remote, green throughout, thin, scabrous on the margins, the uppermost 5–15 cm. long, 2–6 mm. wide: involucre bracts 2



to 4, green throughout or brownish at base, the longest 3-9 cm. long: spikelets 3 to 30, on slender simple or forked minutely hairy peduncles (1-6 cm. long), in anthesis oblong-ovoid, 6-10 mm. long, in fruit 1.5-3 cm. long: scales greenish drab to lead color, ovate to lanceolate, 4-6 mm. long, the prominent often scabrous midrib extending quite to the tip, in the outermost sometimes prolonged as a short scabrous mucro; anthers linear-oblong, 1-1.25 mm. long: achenes oblong-obovoid, trigonous, 2.5-3.5 mm. long: bristles white or pale buff. — *E. polystachium*, Pursh, Fl. 58 (1814); Eaton, Man. 11 (1817); Torr. [*polystachyon*], Fl. 66 (1824); Beck, Bot. 427 (1833); Eaton & Wright, Bot. 237 (1840); Torr. [*polystachyum*], Fl. N. Y. ii. 359 (1843); Britton & Brown (*polystachyon*), Ill. Fl. i. 273 (1896), in part, incl. fig. 641; Small, Fl. 175 (1903). *E. latifolium*,  $\beta$ . *viridi-carinatum*, Engelm., Am., Jour. Sci. xlv. 103 (1844). *E. polystachyon*, var. *latifolium*, Gray, Man. 529 (1848), not *E. latifolium*, Hoppe.— Bogs and wet meadows, Newfoundland to Saskatchewan and British Columbia, south to Connecticut, New York, Ohio, Michigan, Wisconsin, and said to follow the mountains to Georgia. Fruiting, southern New England, May and June; Gulf of St. Lawrence, July, August. Of the 70 sheets of specimens examined the following may be cited as typical. NEWFOUNDLAND, sphagnous swamps, near Topsail, Conception Bay, August, 1901 (*Howe & Lang*, nos. 1287, 1292): QUEBEC, peat-bogs, Salt Lake, Anticosti, August 10, 1883 (*J. Macoun*, Herb. Geol. Surv. Can., no. 32,273); Forteau, lat. 51°, July 31, 1882 (*J. A. Allen*, no. 13); arbor-vitae swamps, Carleton, July 24 & 27, 1904 (*Collins, Fernald & Pease*): NEW BRUNSWICK, Campellton, July 1, 1876 (*R. Chalmers*, Herb. Geol. Surv. Can. no. 32,271): NOVA SCOTIA, peat-bogs, Sydney Mines, July 14, 1883, bogs, Yarmouth, June 23, 1883 (*J. Macoun*, Herb. Geol. Surv. Can., nos. 32,281, 32,261): ONTARIO, near Sarnia, June 5, 1892 (*C. K. Dodge*); bog, Casselman, June 12, 1892, and swamps, near Tetreauville, June 1, 1903 (*J. Macoun*, Herb. Geol. Surv. Can., nos. 32,267, 61,192): MANITOBA, tamarack swamp, near Sewell, June 12, 1896 (*J. Macoun*, Herb. Geol. Surv. Can., no. 16,389): SASKATCHEWAN, muskeag, Prince Albert, July 1, 1896 (*J. Macoun*, Herb. Geol. Surv. Can., no. 16,391): ALBERTA, bogs, Elbow River, July 12, 1897 (*J. Macoun*, Herb. Geol. Surv. Can., no. 25,329): BRITISH COLUMBIA, Kicking Horse Lakes, July 23, 1885 (*J. Macoun*, Herb. Geol. Surv. Can., no.

32,285): MAINE, larch swamps, St. Francis River, Aug. 13, 1902; swale, St. Francis, June 18, 1898 — no. 2085; marl, Fort Fairfield, June 22, 1898 — no. 2084; cedar swamp, Blaine, June 23, 1898 — no. 2083; wet meadows, Island Falls, June 10, 1898 — no. 2082; low woods and thickets, Dover, June 24, 1895 — no. 224 (all *M. L. Fernald*): NEW HAMPSHIRE, Flume, Franconia, June 29, 1855 (*Wm. Boott*); wet meadow, Crawford, July 1, 1898 (*E. F. Williams*): VERMONT, Manchester, July 5, 1898 (*M. A. Day*, no. 289): MASSACHUSETTS, Ashburnham, June 22, 1896 (*S. Harris*); vicinity of Boston, 1892 (*Biltmore Herb.*, no. 373a); open wet ground, Buckland, May 30, 1902 (*F. F. Forbes*); swale, Williamstown, May 31, 1898 (*J. R. Churchill*): RHODE ISLAND, North Providence, May, 1846 (*G. Thurber*); Morris Swamp, Providence, May 24, 1891 (*J. F. Collins*): CONNECTICUT, swamps, Southington, June 30, 1897 (*C. H. Bissell*, no. 708); Kent, June 3, 1894 (*C. K. Averill*): NEW YORK, western part of state (*A. Gray*, Gram & Cyp., no. 90); marsh near Utica, June 4, 1901 (*J. V. Haberer*, no. 1162): OHIO (*Sullivant*): MICHIGAN, swale, Keweenaw Co., August, 1888 (*O. A. Farwell*, no. 691); Port Huron (*C. K. Dodge*): WISCONSIN, Elkhart Lake, Green Bay, June, 1879 (*J. H. Schuette*).

Very unlike the European *Eriophorum latifolium*, Hoppe, which has the thin membranous dark scales with nerveless tips, and the bases of the involucre and the summits of the upper sheaths dark-girdled as in *E. polystachion*.

Var. **Fellowsii**. Spikelets all sessile or subsessile in a dense glomerule.—*E. polystachion*, var. *Vaillantii*, Fernald, *Rhodora*, iv. 82 (1902); Hoffmann, *Rhodora*, vi. 203; not Duby. —MAINE, Peaks Island, Portland Harbor, June 16, 1901 (*D. W. Fellows*): MASSACHUSETTS, Sheffield, June 1, 1902 (*M. L. Fernald*).

+ + Scales of the spikelets with several prominent ribs: stamen 1.

**E. VIRGINICUM**, L. Culms slender, wiry, terete below, trigonous above, smooth, 4–12 dm. high: leaves with close sheaths, elongate-linear, firm, scabrous on the margins, flat except at tip, the uppermost 1–2.5 dm. long, 1.5–4 mm. wide: involucre bracts 2 to 5, very unequal, somewhat divergent, the longest 4–12 cm. long: spikelets few to many, mostly crowded in a dense glomerule (1.5–6 cm. thick), in anthesis elliptic-ovoid, 6–10 mm. long, in fruit 1–2 cm. long: scales ovate-oblong, blunt or acutish, 3–5 mm. long, the strongly

striate-ribbed body greenish to straw-color, the thinner nerveless margin red-brown: anthers linear, 1.5 mm. long: achenes narrowly oblong, trigonous, attenuate below, abruptly short-beaked above, 3-4 mm. long: bristles tawny to copper color. —Sp. 52 (1753); Michx., Fl. i. 34 (1803); Pursh, Fl. i. 58 (1814); Ell. Sk. i. 92, t. 4, fig. 1 (1821) — uncharacteristic; Big., Fl. Bost. ed. 2, 24 (1824); Torr., Fl. 66 (1824), Ann. Lyc. Nat. Hist. N. Y. iii. 338 (1836), and Fl. N. Y. ii. 358 (1843); Gray, Man. 529 (1848); Britton & Brown, Ill. Fl. i. 273, fig. 643 (1896); Small, Fl. 175 (1903). *Eriophoropsis virginica*, Palla, Bot. Zeit. liv. ab. 1, 150, 151 (1896).—Bogs and meadows, Newfoundland to Ontario and Michigan, south to Georgia. Fruiting, July to September.

Var. ALBUM, Gray. Bristles whitish.—Man. ed. 5, 566 (1867); Britton & Brown, l. c.—A scarcely noteworthy extreme, Quebec and Ontario to Connecticut and New York.

(To be continued.)

## PLANTS OF ONEIDA COUNTY, NEW YORK, AND VICINITY,—I.

J. V. HABERER, M. D.

IN the latter part of July, 1904, the writer, in company with Mr. L. M. McCormick of New York, spent several days botanizing in the town of Forestport, which forms the northeastern corner of Oneida County. A number of rare and interesting plants were found including one recently described in RHODORA, therefore, the accompanying notes may be of interest to its readers.

The region visited is on the southwestern border of the great Adirondack wilderness, about forty miles north of Utica, and includes White, Otter, Round and Long Lakes, Deer Pond, mountainous woods, extensive beaver meadows or marl marshes, and sandy fields, all within a radius of three miles. A ridge of Archaean rock, extending from the northeast to the southwest, divides the region into two nearly equal portions. On the southeastern slope is White Lake, perfectly clear and transparent, and on the northwestern, the other



lakes, with the dark color characteristic of Adirondack waters. To the north and east, there is an unbounded stretch of mountains and woods, and to the south and west, a country that is, for the most part, much lower, flat, barren and sandy. The streams are rapid, and although flowing to the south, the drainage is into Lake Ontario through the Black River, the elevation of which at the ingress of these streams is about 1100 feet.

White Lake, the central point of observation, lies at an altitude of about 1450 feet above the sea level, and is in latitude  $43^{\circ} 32'$  N., and longitude  $75^{\circ} 13'$  W. of Greenwich. It is an intermediate station on the main artery of travel, that leads to the famous "North Woods" and John Brown Tract.

The flora of this portion of the county is similar to that of the adjacent Adirondacks,<sup>1</sup> in some respects it bears relationship to that of the Mohawk Valley,<sup>2</sup> and combines features common to both regions.

Forty years ago when Paine's Catalogue of the Plants of Oneida County and Vicinity<sup>3</sup> was published, the region in question was little known and almost inaccessible; therefore, the following list of plants with notes, includes only those (with few exceptions), that are additions to or admit of comparison with the record in that comprehensive work.

The asterisk (\*) indicates plants not included in the Catalogue; the dagger (†) those included in that work, but with no definite record of their having been found in the county.

Specimens of many of the plants have been contributed to the Gray Herbarium at Harvard University, and the State Herbarium at Albany. Acknowledgments are due to Dr. B. L. Robinson, Mr. M. L. Fernald and Prof. C. H. Peck for assistance in the determination of doubtful plants. A number of plants are as yet undetermined, and a report of these and many others from different portions of Central New York must be deferred to subsequent issues of this Journal.

\* *DROSERA ROTUNDIFOLIA*, var. *COMOSA* Fernald, *RHODORA*, vii. 8. One of the first plants to attract our attention was a dwarf form of

<sup>1</sup> The altitude of Jock's (Honnedaga) Lake, the highest in the woods, is 2187 feet.

<sup>2</sup> The average elevation of Utica is 500 feet, and of the Mohawk river bank at this point 410 feet.

<sup>3</sup> 18th Rep. N. Y. Mus. Nat. Hist. 53-192. 1865.

sundew, with rounded leaves and "subcapitate inflorescences of few flowers." It was quite abundant in the marl marshes, and on the boggy margins of the lakes, alone, or in company with *Drosera rotundifolia* L., † *Juncus alpinus* Vill., and other plants; also on treacherous sloughs bordering Deer Pond, with, but outnumbered by † *Drosera intermedia* Hayne. Specimens were sent to the Gray Herbarium and Mr. Fernald very kindly identified them as being "exactly" the plant which he had "in print for the forthcoming January RHODORA." On consulting my herbarium I found that I had previously, July 11, 1902, collected immature specimens of this curious plant, on the marl margins of a Deer Pond (altitude 1950 ft.), near North Lake, Wilmurt, Herkimer County. The companion plants were *Drosera intermedia* Hayne, *Xyris montana* Ries, and the rare *Juncus stygius*, var. *Americanus* Buchenau! This evasive rush known in Somerset County, Maine, and mentioned by Mr. Fernald (RHODORA, vi. 41 and vii. 8), as growing in the Gaspé County bog, has a precarious existence in the State of New York. Perch Lake, Jefferson County, the station recorded in Paine's Catalog, 145, and the only one known for years, was destroyed long ago. The plant, however, was rediscovered in the State by Professor C. H. Peck, "on the marshy borders of a lake" in the Adirondacks (27 Rep. N. Y. Mus. Nat. Hist. 113). Dr. Peck very discreetly withheld the exact locality. He has lately informed the writer that it was in Essex County. Therefore, I am doubly fortunate in recording this plant in Herkimer County, and in the discovery of the unique sundew in a region far removed from the type locality.

\* *XYRIS MONTANA* Ries. There was a luxuriant growth of this species on the borders of White Lake and along its outlet, at Round Lake, Deer Pond, and in the beaver meadows. In a peat bog immense patches were in full bloom July 23. The sight was a beautiful one, worth going miles to see, and was ample recompense for the inconvenience of a sudden downpour of rain. Amongst the myriads of plants, an occasional one was found in which the lowest scale of the flowering head was transformed into a bract 5-15 mm. long. It may be designated as forma **bracteosa**.

\* *XYRIS CAROLINIANA* Walt. Common on the sandy and gravelly shores of White Lake, barely in flower on the above date and not detected elsewhere. An intermediate form with the leaves of *X. montana* and the heads of *X. Caroliniana* was common at White Lake,

and in a beaver meadow near Round Lake, fully as far advanced in flowering as the former species. *X. montana* has been found by Mr. W. E. Wolcott and the writer, at several stations in the vicinity of North Lake. Previous records of these plants in northern New York are very meagre. Paine (l. c. 146) mentions but one (*X. bulbosa* Kunth), and specimens of his *X. montana* and *X. flexuosa* from Herkimer County, are cited by H. Ries, Bull. Torr. Cl. xix. 35. Probably both species were collected on the "muddy edges" of ponds, on Bald Mountain, a long, narrow, rocky ridge nearly destitute of trees, north of Third Lake, one of the Fulton chain of lakes, Webb, North Herkimer County (altitude 2200 ft.). Paine's locality is ten to fifteen miles north of any that I have reported. It is of interest to note that these plants also have their habitats in the Hudson Valley and on Long Island (see Ries, l. c. 37, 38, 40, and Peck, Rep. xxii, 103).

† ELATINE AMERICANA Arnott. This plant was one of the delightful surprises of the trip — completely covering the sandy bottom, in the shallow clear waters of White Lake. Paine's record (l. c. 65) is Albany, Beck. Sand Lake and Averell Lake, Rensselaer County, are the stations for my specimens from C. H. Peck and J. H. Wibbe. I can find no record of the plant ever having been found before in this State, west of the valley of the Hudson.

\* MICROSTYLIS OPHIOGLOSSOIDES Nutt. *Achroanthes unifolia* (Mx.) Raf. The most abundant orchid in the White Lake region, growing in thin soil on rocks, in woods, marshes and sandy fields, nearly always in the shade of *Pteris*. I first collected this plant July 8, 1903, on sandy bluffs (alt. 550 ft.), four miles west of Utica. Mr. I. W. Street reports it common at Brantingham Lake, Lewis County. The plant has hitherto been overlooked in Central New York and is not included in Mr. Homer D. House's list of the orchids (Torreya, iii. 49). Specimens are in the State Herbarium from Chenango County (Coville), and north Herkimer County (Goodrich).

HABENARIA GRANDIFLORA (Bigel.) Torr. The beautiful Soldier's Plume is occasional along White Lake outlet. It abounds in several forms on the headwaters of the Black River, near North Lake (alt. 1827 ft.). Paine (l. c. 126) found it west of Old Fort Bull, Rome (alt. 415 ft.). It is omitted from the list quoted above.

\* CORALLORHIZA MULTIFLORA FLAVIDA Peck. On a shady knoll near White Lake. The plants were very yellow and the lip unspotted.



\* *GOODYERA TESSELLATA* Lodd. Frequent in cold mountainous woods at Long and Otter Lakes; wooded slopes of Bald Mountain, August, 1895.

\* *GOODYERA REPENS OPHIOIDES* Fernald. Woods at Otter Lake. Mountain trail, Hardscrabble Lake (alt. 2050 ft.), Wilmurt; and in woods on Frankfort Hill (alt. 1400 ft.), Herkimer County. Near Oneida Lake (alt. 370 ft.), found there also by H. D. House (Torreya, iii. 165). Paine records several localities for *G. repens*. It grows in cold woods north of White Lake, on slopes of Bald Mountain, and ridges of ravines near Utica (alt. 900 ft.).

*LYCOPODIUM INUNDATUM* L. Abundant on the sandy and boggy margins of the Lakes, and in the beaver meadows. Opposite Utica in a sand bog (Fern Bull. ix. 88); east of the city in sandy fields. Bald Mt., and sand plains of Rome, also by Paine (l. c. 180-181), head of Oneida Lake, also by House (l. c. 166). The latter reports it at Ohio (Fern Bull. x. 16) (1370 ft.), and W. E. Wolcott at several stations near North Lake, all in Herkimer County. This record indicates a generous distribution especially in this region (Central Basin, see Fern Bull. xii. 97-105), famous for its large number of orchids and *Botrychia*. Utica is apparently the southern limit of the plant in Central New York. On the sandy shores of White Lake it was found well illustrating the fairy-ring like growth so interestingly described by Dr. B. L. Robinson, RHODORA, I. 28.

\* *LYCOPODIUM CLAVATUM MONOSTACHYON* Grev. & Hook. Common on the shores of White Lake; mounds in a pasture near Tauberg, Oneida Co., June 16, 1904. I first found this plant August 12, 1895, on the slopes of Bald Mountain (Fern Bull. xii. 104), where it was associated with *Carex leporina* L. (see Fernald, Proc. Am. Acad., xxxvii. 479, and RHODORA, iv. 229) and failed to realize the rarity of either plant. Prof. Peck has collected the former in Essex and Washington Counties.

\* *LYCOPODIUM CLAVATUM BREVISPICATUM* Peck (54th Rep. N. Y. Mus. Nat. Hist. 162). On rocky slopes near White Lake, a form of club moss was found that resembles Professor Peck's plant from Wallface Mountain. "The leaves of the branches are closely imbricated and strongly incurved, and the spikes are short, thick and generally very blunt."

\* *BOTRYCHIUM MATRICARIAE* Spreng. Fine specimens on a mossy

shaded bank at White Lake. Mr. B. D. Gilbert and the writer found a single plant on the Whitestown bluffs, in October, 1902, the station recorded for *Microstylis*, and it is of interest to note that Mr. Gilbert (Fern Bull. xii. 99) records this *Botrychium* from Lewis County.

(To be continued.)

## CHLOROCHYTRIUM LEMNAE IN AMERICA.

FRANK S. COLLINS.

PLANTS of the genus *Chlorochytrium* are of interest from their peculiar habitat and their special adaptations to the same. They are unicellular algae, and live in the tissues of higher, or at any rate larger organisms; not really as parasites, as they have well developed chromatophores and can assimilate their own nourishment; nor does it appear to be a case of symbiosis, as it is not easy to see what advantage their presence is to the host plants. Another point of interest is that *Chlorochytrium* is one of the relatively few genera represented both in salt and in fresh water; of the salt water forms three are known as American; *C. inclusum* Kjellm., in red algae at Greenland and from Alaska to Washington; the development of this species has been studied by Freeman<sup>1</sup>; *C. dermatocolax* Reinke, in *Chaetopteris* and *Sphacelaria* in Greenland; and *C. Schmitzii* Rosenv., in various loose tissue algae from Greenland to Maine. *C. Cohnii* Wright is found in *Enteromorpha* and some other algae, and in the gelatinous sheaths of such diatoms as *Schizonema*, along the New England coast; but this is now usually put in another genus, as *Chlorocystis Cohnii* (Wright) Reinhard. This species has been studied by Moore,<sup>2</sup> and the development well worked out.

Of the fresh water species the best known is *C. Lemnae* Cohn, which appears to be generally distributed in Europe, and whose development is quite well known. The host plant is *Lemna trisulca*

<sup>1</sup> E. M. Freeman, Observations on *Chlorochytrium*; Minn. Bot. Studies, Vol. II, p. 195, 1899.

<sup>2</sup> G. T. Moore, New or little known unicellular algae. I. *Chlorocystis Cohnii*; Bot. Gazette, Vol. XXX, p. 100, 1900.

L., which although apparently not common in America, certainly not in New England, is widely distributed, practically all over the United States. As most European fresh-water algae occur in America, there seemed to be reason to expect *C. Lemnae*, and by the kindness of Dr. B. L. Robinson, the writer was able to make an examination of the *Lemna trisulca* in the Gray herbarium. The result was satisfactory, as in the first specimen examined every frond contained many individuals of the *Chlorochytrium*, in various stages of development. The specimen was from Seabrook, New Hampshire, collected by Mr. A. A. Eaton, 18 July, 1896. That this species belongs in our flora is therefore certain, but that it is common is unlikely, for on examination of the other specimens, about twenty-five in all, from all parts of North America, not a single instance of the occurrence of the endophyte was found.

The cells of the *Chlorochytrium* show as relatively large, ovoid or ellipsoid, dark green bodies, between the cells of the host; they are to be detected only by microscopic examination, but are then seen easily with relatively low powers. When fully mature, the contents of the cell is transformed into numerous biciliate zoospores, of the usual ovoid form; the cells of the host plant have been pushed apart by the growth of the *Chlorochytrium* so that when the wall of the latter breaks, the zoospores pass out into the water, not free, but enclosed in a gelatinous vesicle; within this they conjugate, and the 4-ciliate zygote then escapes from the gelatine and swims freely for a while; then it comes to rest. Unless it settles upon a frond of *Lemna trisulca*, it perishes; but if attaching itself to this frond, it germinates, the pointed end, from which the cilia have fallen, pushing in between the cells of the host, till it reaches a comparatively open space, when it expands, and the protoplasm is drawn in, only a small button-like appendage remaining to show the point of entrance; the cell then grows to the full size, and zoospores are again formed.

There are several other endophytic algae found in Europe, whose development more or less resembles that of this species; a search for some of them was made in the Gray Herbarium, without results. An herbarium specimen is usually selected to show a plant in its best condition, while the endophytes usually do not reach their full development until the host has passed its prime; better success may be expected from an examination of living plants of the suspected hosts. The following European species have been well studied, and



can readily be identified. *Chlorochytrium Knyanum* Cohn & Szym., in *Lemna minor* L., *L. gibba* L., *Ceratophyllum demersum* L. and *Elodea Canadensis* Michx.; *Endosphaera biennis* Klebs in *Potamogeton lucens* L.; and *Phyllobium dimorphum* Klebs in *Lysimachia Nummularia* L., *Ajuga reptans* L., *Chlora serotina* Koch, and *Erythraea Centaurium* Pers. Undoubtedly many other species occur in other hosts, and there is quite a field here for a careful and persistent investigator.

MALDEN, MASSACHUSETTS.

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DICKSONIA PILOSIUSCULA FORMA SCHIZOPHYLLA IN VERMONT. — Last August, while devoting myself most assiduously to the ferns of Dorset, Vermont, I brought in one day, two fronds of what I at first supposed to be a peculiar form of *Nephrodium spinulosum*. In the autumn I sent them with a number of others to Mr. Davenport, who pronounced them to be not *Nephrodium*, but a form of *Dicksonia*, found in Andover, Connecticut, in 1901, by Mr. A. Vincent Osmun of Amherst, and described by Mr. Clute in the Fern Bulletin for July, 1902, as *Dicksonia pilosiuscula*, forma *schizophylla*. I have compared the Dorset fronds with the type specimens at Amherst, and while these are larger, the peculiar texture and cutting are the same, and Mr. Osmun agrees in the determination. — EMILY HITCHCOCK TERRY, Northampton, Massachusetts.

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THREE PLANTS NEW TO THE FLORA OF VERMONT. — There has long been a tradition that the Canadian Waterleaf (*Hydrophyllum canadense*, L.) grew in Williamstown, Massachusetts; and naturally it has been sought for upon the slopes and in the ravines of Greylock Mountain, where its congener *H. virginianum* is common. In RHODORA vi. 155, 156, Mr. Deane cites the frequent reports of its occurrence in western Massachusetts, and notes nevertheless the want of any existing specimens from New England to substantiate these reports. Since then Mr. Hoffmann has reported (RHODORA, vi. 205) his discovery of the plant near Greylock in Massachusetts in the summer of 1904; and Mr. Deane's prediction that "botanists will certainly visit that locality again, and the species will surely come to light before long," has been verified.

In June, 1904, the writer also had the pleasure of finding the plant in Pownal, in the State of Vermont. It was growing in rich low woods along the bank of a brook near the Hoosac River. Although on opposite sides of the line between the two States the two stations are not many miles apart. The town of Pownal is in the southwest corner of Vermont, and the discovery of this Waterleaf there confirms also the indefinite report of its collection in that part of the State by Robbins, in Thompson's History of Vermont, 1842, p. 192,<sup>1</sup> and the Canadian Waterleaf may now be definitely credited to the flora of both Massachusetts and Vermont on the authority of herbarium specimens.

Associated with the Waterleaf in the alluvial soil of the glen were Goldie's Fern (*Aspidium Goldianum*) and the Narrow Spleenwort (*Asplenium angustifolium*) ferns which are only "occasional" in the Vermont flora, and they made an attractive setting for the novel jewel in their midst.

In Vermont also, and new to the recently published List, are two Sedges. The first, *Carex trichocarpa*, Muhl., which is frequent along the Hoosac River in Williamstown, I traced down the river northward into Pownal, where it was growing in wet places, less abundantly than above. It is doubtless scattered along the river-bank still farther down.

Broad Brook is a beautiful stream which flows from the Green Hills of Pownal to the sluggish and muddy Hoosac. It was in rocky woods far up this brook that I found *Carex aestivalis*, M. A. Curtis. Specimens from both these collections are in my herbarium and President Brainerd of Middlebury has duplicates of the latter. — J. R. CHURCHILL, Boston, Massachusetts.

<sup>1</sup> Referred to at the end of the Flora of Vermont; Dec., 1900, p. 106; and by Deane in RHODORA, vi. 184.

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